PSGR
Krishnammal College for Women

DEPARTMENT OF COMPUTER SCIENCE WITH COGNITIVE SYSTEMS

CHOICE BASED CREDIT SYSTEM (CBCS)
&
LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (LOCF)

BACHELOR OF COMPUTER SCIENCE WITH COGNITIVE SYSTEMS
2025-2028 BATCH

Programme Learning Outcomes

After completion of the programme, the student will be able to

PLO1 : Exhibit in-depth knowledge in the discipline of computer science and skills in providing computerized solution

PLO2 : Interpret theoretical connections between mind, intelligence, cognition, computation, creativity, information, language, and perception

PLO3 : Apply cognitive, design thinking and critical problem-solving skills to establish a productive career in industry, research, and academia

PLO4 : Demonstrate with hands-on experience on current technological tools and effective communicative skills to meet the demands of IT / ITeS / ITIS companies

PLO5 : Pursue higher studies / employ themselves either as software professionals or entrepreneurs through their technical competencies

Programme Specific Outcomes

The students at the time of graduation will

PSO1 : Exhibit profound knowledge in cognitive science such as Linguistics, Psychology, Artificial Intelligence and Neuroscience

PSO2 : Apply skills in the areas like Artificial Intelligence and Machine Learning algorithms, Robotic Process Automation, DevOps Tools, Virtualization and Cloud to design and develop applications

PSGR Krishnammal College for Women

Bachelor ofComputer Science with Cognitive Systems
Choice Based Credit System (CBCS)
Learning Outcomes Based Curriculum Framework (LOCF)
Syllabus & Scheme of Examination
2025 - 2028 Batch
Semester I

Semester	Part	Course Code	Title of the Course	Category	Instruction Hours / Week	Contact Hours	Tutorial Hours	Duration of Examination	Examination Marks			Credits
									CA	ESE	Total	
I	I	TAM2501A/ HIN2501A / FRE2501A	Tamil Paper I/ Hindi Paper I/ French Paper I	L	4	58	2	3	25	75	100	3
I	II	ENG2501A	English Paper I	E	4	58	2	3	25	75	100	3
I	III	CG25C01	Operating Systems	CC	4	58	2	3	25	75	100	3
I	III	PP22C02	Computational and Algorithmic Thinking for Problem Solving	CC	3	45	-	-	100	-	100	3
I	III	TH24A03	Numerical and Statistical Techniques	GE	6	88	2	3	25	75	100	5
I	III	CG25CP1	Operating Systems Lab	CC	4	60	-	3	15*	35*	50	2
I	III	CG23CP2	Worksheets Lab	CC	3	45	-	3	15*	35*	50	2
I	IV	NME25B1 / NME25A1	Basic Tamil I / Advance Tamil I	AEC	2	28	2	-	100	-	100	2
I	IV	NME23ES	Introduction to Entrepreneurship	AEC	2	30	-	-	100	-	100	
I	VI	NM25GAW	General Awareness	AECC	SS	-	-	-	100	-	100	Gr
I-II	VI	COM25SER	Community Services 30 Hours	GC	-	-	-	-	-	-	-	-
I-V	VI	24BONL1 24BONL2 24BONL3	Online Course I Online Course II Online Course III	ACC	-	-	-	-	-	-	-	-
II	I	TAM2502A/ HIN2502A / FRE2502A	Tamil Paper II / Hindi Paper II / French Paper II	L	4	58	2	3	25	75	100	3
II	II	ENG2502A	English Paper II	E	4	58	2	3	25	75	100	3
II	III	CG23C03	Computer Networks	CC	4	58	2	3	25	75	100	3
II	III	CG23C04	Computer Organization and Architecture	CC	3	43	2	3	25	75	100	2
II	III	TH24A11	Discrete Mathematics	GE	6	88	2	3	25	75	100	5
II	III	CG25CP3	Computer Networks Lab	CC	3	45	-	3	15#	35#	50	2

II	III	CG25CP4	Web Technologies Lab	CC	4	60	-	3	15#	35#	50	2
II	IV	NM25UHR	Universal Human Values and Human Rights	AECC	2	30	-	-	100	-	100	2
II	IV	*NME25B2/ NME25A2	Basic Tamil II / Advanced Tamil II	AEC	-	-	-	-	100	-	100	Gr
I - II	VI	NM25GAW	General Awareness	AECC	SS	-	-	-	100	-	100	Gr
I - II	VI	COM25SER	Community Services 30 Hours	GC	-	-	-	-	-	-	-	-
I-V	VI	24BONL1 24BONL2 24BONL3	Online Course I Online Course II Online Course III	ACC	-	-	-	-	-	-	-	-

*CA conducted for 25 and converted into 15, ESE conducted for 75 and converted into 35
*After class hours

L	:	Language	AECC	:	Ability Enhancement Compulsory Course
E	:	English	ACC	:	Additional Credit Course
CC	:	Core Course	CA	:	Continuous Assessment
GE	:	Generic Elective	ESE	:	End Semester Examination
AEC	:	Ability Enhancement Course	GC	:	General Course
SS	:	Self Study	Gr	:	Grade

Mapping of PLOs with CLOs

COURSE 1 - CG25C01

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	M	S	M	M
CLO3	S	S	S	M	M
CLO4	S	S	M	M	S

COURSE 2 - PP22C02

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	S	S	M	S	S

COURSE 3 - CG25CP1

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

COURSE 4 - CG23CP2

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	M	S	S	S
CLO3	S	S	M	S	S
CLO4	S	M	M	S	S

COURSE 4 – CG23C03

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	S	S	M	S	S

COURSE 5 – CG23C04

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	S	S
CLO2	S	S	S	S	M
CLO3	S	M	S	S	S
CLO4	S	S	S	S	S

COURSE 6 – CG25CP3

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	S	M	S	S
CLO3	S	M	S	S	S
CLO4	S	S	S	M	S

COURSE 7 – CG25CP4

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

Evaluation Pattern 25-28 Batch onwards

CA Question Paper Pattern and distribution of marks UG

Language and English

Section A 5 x 1 (No choice)	: 5 Marks
Section B 4 x 5 (4 out of 6)	: 20 Marks (250 words)
Section C 2 x 10 (2 out of 3)	: 20 Marks (500 words)
Total	**: 45 Marks**

UG & PG- Core and Allied - (First 3 Units)

CA Question from each unit comprising of

One question with a weightage of 2 Marks	: 2 x 3 = 6
One question with a weightage of 5 Marks (Internal Choice at the same CLO level)	: 5 x 3 =15
One question with a weightage of 8 Marks (Internal Choice at the same CLO level)	: 8 x 3 =24
Total	**: 45 Marks**

End Semester Examination – Question Paper Pattern and Distribution of Marks

Language and English – UG

Section A	10 x 1 (10 out of 12)	:	10 Marks
Section B	5 x 5 (5 out of 7)	:	25 Marks (250 words)
Section A	4 x 10 (4 out of 6)	:	40 Marks (600 - 700 words)
Total		**:**	**75 Marks**

UG & PG - Core and Allied courses:
ESE Question Paper Pattern: 5 x 15 = 75 Marks
Question from each unit comprising of

One question with a weightage of 2 Marks	: 2 x 5=10
One question with a weightage of 5 Marks (Internal Choice at the same CLO level)	: 5 x 5 =25
One question with a weightage of 8 Marks (Internal Choice at the same CLO level)	: 8 x 5 =40

Continuous Internal Assessment Pattern

Theory

I Year UG / PG

CIA Test	: 5 marks (conducted for 45 marks after 50 days)
Model Exam	: 7 marks (Conducted for 75 marks after 85 days (Each Unit 15 Marks))
Seminar/Assignment/Quiz	: 5 marks
Class Participation	: 5 marks
Attendance	: 3 marks
Total	**: 25 Marks**

Practical

Lab Performance	: 7 marks
Regularity	: 5 marks
Model Exam	: 10 marks
Attendance	: 3 marks
Total	**: 25 marks**

ESE Practical Pattern

The End Semester Examination will be conducted for a maximum of 75 marks respectively with a maximum 15 marks for the record and other submissions if any.

Part IV

Introduction to Entrepreneurship

Quiz	: 50 marks
Assignment	: 25 marks
Project / Case study	: 25 marks
Total	**: 100 Marks**

Course Code	Course Title	Category	L	T	P	Credit
CG25C01	Operating Systems	Theory	58	2	-	3

Preamble

The objective of the course is to provide knowledge on the functionalities of the client and server operating system. It will enable the students to install, configure, deploy, manage, and maintain the operating system. It provides comprehensive coverage on Industry 4.0.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the functionalities of client and server operating systems and industry 4.0 technologies	K1
CLO2	Understand the steps to install, configure and deploy the windows server operating system	K2
CLO3	Illustrate the steps in managing and maintaining windows server operating system	K3
CLO4	Demonstrate the steps to implement, manage and maintain Group Policy, Disk Partitioning, File Management, DHCP, DNS and analyze various Industry 4.0 technologies and automation processes in different domains	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	M	S	M	M
CLO3	S	S	S	M	M
CLO4	S	S	M	M	S

S - Strong; M – Medium.

Operating Systems - CG25C01 **58 Hrs**

Syllabus

Unit I **11 Hrs**

Operating System Overview - Hardware Basics - Windows 10: Installing, Configuring and Deploying Windows 10 - System Maintenance: Hardware - Managing Disks and Drives - Automating Tasks and Activities.

Unit II **12 Hrs**

Windows Server 2019 Overview – Installing Windows Server 2019 – Understanding the registry and services – Working with the registry and services – Understanding Windows Server initial configuration – Directory Services in Windows Server 2019 – Understanding the AD infrastructure – Understanding DNS – Understanding OUs and containers – Understanding accounts and groups.

Unit III **12 Hrs**

Adding Roles to Windows Server 2019 – Server roles and features – Application Servers – Web Services – Remote Access – File and Print Services - Configuring Windows Server 2019 – Group Policy in Windows Server 2019 – Managing GPOs – GPO configuration values – Processing GPOs – Types of GP editors

Unit IV **13 Hrs**

Virtualization with Windows Server 2019 – Server Virtualization – Hyper- V Manager - Storing Data in Windows Server 2019 – Storage Technologies - Different storage types – Local storage and Network storage – Differentiating between block level storage and file-level storage – Adaptor and controller types – serial bus technologies – storage protocols – file sharing protocols – S2D - dedup – storage tiering – Managing storage with Server Manager and Windows PowerShell - RAID

Unit V **10 Hrs**

Introduction to Industry 4.0 - Need - Reasons for Adopting Industry 4.0 - Definition - Goals and Design Principles - Technologies of Industry 4.0 - Skills required for Industry 4.0 - Advancements in Industry 4.0 - Impact of Industry 4.0 on Society, Business, Government and People - Introduction to 5.0

Text Book

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Bott, Ed, and Craig Stinson	Windows 10 Inside Out	Microsoft Press	2016, 1st Edn
2	Bekim Dauti	Windows Server 2019 Administrations Fundamentals	Packt	2019, 2nd Edn
3	P. Kaliraj, T. Devi	Higher Education for Industry 4.0 and Transformation to Education 5.0	CRC Press – Taylor and Francis Group	2020, 1st Edn

Reference Books

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Svidergol. B Meloski.V, Wright .B, Martinez .S &Bassett .D	Mastering Windows Server 2016	John Wiley & Sons	2018, 1st Edn
2	Orin Thomas	Windows server 2019 Inside out	Microsoft Press	2020, 1st Edn

Web resources

- https://docs.microsoft.com/en-us/troubleshoot/windows-server

Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies.

Course Designer

- Dr. N. Prabhu

Course Code	Course Title	Category	L	T	P	Credit
PP22C02	Computational and Algorithmic Thinking for Problem Solving	Theory	45	-	-	3

Preamble

This course aims to kindle the young minds to think like a computer scientist, with the idea that computing, and computers will enable the spread of computational thinking. Computational thinking is thinking recursively, reformulating a seemingly difficult problem into one which we know how to solve and taking an approach to solving problems, designing systems, and understanding human behaviour that draws on concepts fundamental to computer science.

Course Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Define the basic principles of logical reasoning, problem solving in computational thinking	K1
CLO2	Understanding the applications of propositional logic, problem representation and techniques	K2
CLO3	Apply algorithmic thinking to problem solving using tools	K3
CLO4	Apply and analyze to solve domain specific problems using computational thinking concepts	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	S	S	M	S	S

S-Strong M-Medium

Computational and Algorithmic Thinking for Problem Solving - PP22C02 45 Hrs

Syllabus

Unit I 7 Hrs

Basics: Introduction to Computational Thinking- Data Logic - History of Computational Thinking- Applications of Computational Thinking.

Unit II 8 Hrs

Data- Information and Data - Data Encoding - Logic - Boolean logic - Applications of simple Propositional Logic. Tool: Flowgorithm and Scratch.

Unit III **10 Hrs**

Problem Solving and Algorithmic Thinking: Problem definition- Logical reasoning- Problem decomposition – Abstraction- Problem representation via Algorithmic thinking: Name binding- Selection- Repetition and Control Abstraction - Simple Algorithms - Comparison of performance of Algorithms.

Unit IV **8Hrs**

Activities in Class: Sudoku-Towers of Hanoi- Graph Coloring-Geographical Map reading- Poem reading-Novel reading- Data analysis on news.

Unit V **12Hrs**

Problem Solving Techniques- Factoring and Recursion Techniques- Greedy Techniques-Divide and Conquer- Search and Sort Algorithms- Text Processing and Pattern matching. Tool: iPython

Text Book

S. No	Author	Title of the Book	Publisher	Year and Edition
1	David Riley and Kenny Hunt	Computational Thinking for Modern Solver	Chapman & Hall/CRC	2014, 1st Edn
2	Paolo Ferragina, FabrizioLuccio	Computational Thinking First Algorithms	Springer	2018, 1st Edn
3	Karl Beecher	Computational Thinking - A beginner's guide to problem solving	BSC publication	2017, 1st Edn

Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies

Course Designer

- Mrs. D. Suganthi

Evaluation Pattern

Assessment	Number	Marks
Quiz (online or offline)	5	50
Class Activity	5	25
Group Project (Domain Specific)	1	25
Total		100

Course Code	Course Title	Category	L	T	P	Credit
CG25CP1	Operating Systems Lab	Practical	-	-	60	2

Preamble

The objective of this lab course is to provide the complete knowledge of installation of client / server windows in virtual machines. It will equip the students to perform partitioning management operations, sharing resources and configure network features in the operating system.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understanding the installation of client / server windows in virtual machine and naming the system	K2
CLO2	Illustrate adding roles and features in OS server	K3
CLO3	Demonstrate disk partitioning and replication operations in server	K3
CLO4	Analyze the working of active directory domain service, installation of DNS and DHCP	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	M	S	S	S
CLO2	S	S	M	S	M
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

S - Strong; M – Medium.

Operating Systems Lab - CG25CP1 (60 Hrs)

List of Programs

- Install client Windows 10 in virtual machine and naming the system
- Install Windows server 2019 in virtual machine as an administrator
- Managing roles and features of Windows server 2019
- Disk partitioning in MBR and GPT and creating new volume in disk
- Configure and install Active Directory Domain Service
- Promote the active directory server to domain controller and replication of Windows server
- Implementing group policy for administration in Windows server 2019

- Configuring, managing and installation of DNS in Windows server 2019
- Configuring, managing and installation of DHCP in Windows server 2019
- Configuration and deployment of IIS in Windows server 2019
- Mapping network drive for file sharing and printer sharing

Pedagogy

- Demonstration of working environment / Software

Course Designers

- Dr. N. Prabhu

Course Code	Course Title	Category	L	T	P	Credit
CG23CP2	Worksheets Lab	Practical	-	-	45	2

Preamble

The objective of the lab course is to provide the necessary skills to work with worksheets to automate tasks using VBA code.

Course Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Knowledge on working with cell, range, worksheet, and workbook	K1
CLO2	Explore the simple programs to perform automation tasks	K2
CLO3	Design forms using ActiveX controls	K3
CLO4	Create charts for data and import / export data from different applications	K4

Mapping with Programme Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	M	S	S	S
CLO3	S	S	M	S	S
CLO4	S	M	M	S	S

S- Strong; M-Medium.

Worksheets Lab- CG23CP2 (45Hrs)

List of Programs

- Working with cells, range, worksheets, and workbooks
- Basic mathematical expressions
- Objects, properties, methods, and events.
- Interactive Input/Output, accessing excel formulas using VBA
- Working with simple macros using sequence, selection and repetition
- VBA procedures for data analysis (filter/sorting/removing duplicates)
- Simple macros using string functions
- Simple macros using date functions.
- Simple macros using user-defined functions
- Error handling in VBA
- Data visualization through charts and graphs
- Consolidating multiple sheet
- Import / export data from different applications

- Creating user forms using ActiveX controls
- VBA programs to work with files /folders

Pedagogy

- Demonstration of working environment / Tools / Software / Program

Course Designers

- Mrs. J. Mythili

Course Code	Course Title	Category	L	T	P	Credit
CG23C03	Computer Networks	Theory	58	2	-	3

Preamble

This course is designed to provide knowledge on network, OSI reference model, IP address, routers, switches, various network protocols and network security.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Recall the basic network terminologies, hardware, architectures and security.	K1
CLO2	Understand various reference models, protocols, subnetting and security methods.	K2
CLO3	Demonstrate the working of different networks and protocols.	K3
CLO4	Analyze the characteristics of networks, routing protocols and security techniques.	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	M	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	M	S	S	S
CLO4	S	S	M	S	S

S-Strong; M-Medium

Computer Networks - CG23C03 **(58 Hrs)**

Syllabus

Unit I **11 Hrs**

Introducing Computer Networks - Purpose of Networks - Operation Flow of Computer Networks - Topologies of Computer Networks - The OSI Reference Model: Introduction to the OSI Reference Model - Seven Layers - Benefits of the OSI Reference Model - Introduction the TCP/IP Protocol Suite.

Unit II **12 Hrs**

IP Addressing: The Purpose of IP addresses - The Hierarchy of IP Addresses - Subnetting: Subnetting Basics - IP Address Class and Subnet Mask - Variable Length Subnet - Switches: Purpose of switches - Switch functions - Connecting to Cisco Switch - Configuring Cisco Switch - Managing Cisco Switch Authentication.

Unit III **11 Hrs**

Spanning Tree Protocol - Introducing the Spanning Tree Protocol - STP Operation Flow - Introducing Cisco Options for STP - Introducing Rapid Spanning Tree Protocol - Ether Channel - Monitoring STP -

Virtual Local Area Networks - Introducing Virtual Local Area Networks-Benefits of VLANs - Managing VLANs - VLAN Trunking - VLAN Trunking Protocol.

Unit IV **12 Hrs**

Network Routing - Introducing Network Routes - Routing Protocols - Routed Protocols - Routing Decision Protocols - Routing Decision Criteria - Routing Methods - Routing Information Protocol - Introducing Routing Information Protocol - Enhanced Interior Gateway Routing Protocol - IGRP - The Foundation of EIGRP - EIGRP Benefits - Characteristics of EIGRP - EIGRP Operation - Open Shortest Path First Protocol - Introducing Open Shortest Path First - OSPF Routing Hierarchy.

Unit V **12 Hrs**

Network Security Basics: Network Zoning - Recognizing Security Risks - Introducing Security Risk Mitigation Methods - IP Access Lists - Purpose of Access Lists - Types of Access Control Lists (ACLs) - Managing ACLs-Creating ACLs - Network Address Translation (NAT) - Purpose of NAT - Operational Flow of NAT.

Text Book

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Silviu Angelescu	CCNA Certification All-in - One For Dummies	For Dummies	2010, 1st Edn.

Reference Books

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Behrouz A. Forouzan	Data Communications and Networking	Tata McGraw Hill	2017, 5th Edn.
2	Kurose James F. Ross Keith W.	Computer Networking - A Top-Down Approach	Pearson Education	2017, 6th Edn.
3	William Stallings	Data and Computer Communications	Pearson Education	2017, 10th Edn.

Pedagogy

- Lectures, Group discussions, Demonstrations, Case studies

Course Contents and Presentation Schedule

CG23C03 - Computer Networks					
Module No.	**Topic**	**CLO level**	**No. of Hours**	**Content delivery methods**	**Learning Methods**
Unit - I					
1	Introducing Computer Networks	CLO1, CLO2	1	Lecture, video	Participatory Learning
2	Purpose of Networks	CLO1, CLO2, CLO3	1	Chalk and talk	Participatory Learning
3	Operation Flow of Computer Networks	CLO1, CLO2, CLO3	1	Video, PPT	Participatory Learning
4	Topologies of Computer Networks	CLO2, CLO3	1	Lecture, PPT	Participatory Learning
5	The OSI Reference Model	CLO2, CLO3	1	Lecture, PPT	Participatory Learning
6	Introduction to the OSI Reference Model	CLO2, CLO3	1	Chalk and talk	Participatory Learning
7	Seven Layers	CLO2, CLO3, CLO4	2	Chalk and talk	Experiential Learning
8	Benefits of the OSI Reference Model	CLO2, CLO3,	1	OER	Experiential Learning
9	Introduction the TCP/IP Protocol Suite.	CLO2, CLO3	2	PPT	Problem-based Learning
Unit - II					
10	IP Addressing	CLO1, CLO2, CLO3	1	Chalk and talk/ Picture	Participatory Learning
11	The Purpose of IP addresses	CLO1, CLO2, CLO3	1	Video	Participatory Learning
12	The Hierarchy of IP Addresses	CLO2, CLO3	1	Lecture / Seminar	Experiential Learning
13	Subnetting: Subnetting Basics	CLO2, CLO3	1	Lecture, PPT	Problem-based Learning

14	IP Address Class and Subnet Mask	CLO2, CLO3	1	Lecture, PPT	Problem-based Learning
15	Variable Length Subnet	CLO2, CLO3	1	Video, Lecture	Experiential Learning
16	Switches	CLO2, CLO3	1	Lecture / PPT	Problem-based Learning
17	Purpose of switches	CLO2, CLO3	1	Chalk and talk	Participatory Learning
18	Switch functions	CLO2, CLO3, CLO4	1	Video, Lecture	Problem-based Learning
19	Connecting to Cisco Switch	CLO2, CLO3, CLO4	1	Lecture / PPT	Experiential Learning
20	Configuring Cisco Switch	CLO2, CLO3	1	Video, Lecture	Experiential Learning
21	Managing Cisco Switch Authentication.	CLO2, CLO3, CLO4	1	Video, Lecture	Experiential Learning
Unit - III					
22	Spanning Tree Protocol	CLO1, CLO2	1	Chalk and talk	Problem-based Learning
23	Introducing the Spanning Tree Protocol	CLO2, CLO3	1	Lecture PPT	Participatory Learning
24	STP Operation Flow	CLO2, CLO3	1	Video	Problem-based Learning
25	Introducing Cisco Options for STP	CLO2, CLO3, CLO4	1	Chalk and talk	Experiential Learning
26	Introducing Rapid Spanning Tree Protocol	CLO2, CLO3, CLO4	1	Chalk and talk	Experiential Learning
27	Ether Channel - Monitoring STP	CLO2, CLO3, CLO4	1	Video, PPT	Experiential Learning
28	Virtual Local Area Networks	CLO2, CLO3, CLO4	1	Video, Lecture	Experiential Learning
29	Introducing Virtual Local Area Networks - Benefits of VLANs	CLO1, CLO2	1	OER	Participatory Learning
30	Managing VLANs	CLO2, CLO3, CLO4	1	Chalk and Talk	Experiential Learning

31	VLAN Trunking	CLO2, CLO3, CLO4	1	Demonstration	Problem-based Learning
32	VLAN Trunking Protocol.	CLO2, CLO3, CLO4	1	Demonstration	Problem-based Learning
Unit - IV					
33	Network Routing	CLO1, CLO2	1	Lecture PPT	Participatory Learning
34	Introducing Network Routes	CLO1, CLO2	1	Chalk and Talk	Participatory Learning
35	Routing Protocols - Routed Protocols	CLO1, CLO2	1	Chalk and Talk	Participatory Learning
36	Routing Decision Protocols	CLO2, CLO3	1	Lecture PPT	Participatory Learning
37	Routing Decision Criteria - Routing Methods	CLO2, CLO3	1	Lecture PPT	Problem-based Learning
38	Routing Information Protocol	CLO2, CLO3	1	Video	Experiential Learning
39	Introducing Routing Information Protocol	CLO2, CLO3	1	Video	Experiential Learning
40	Enhanced Interior Gateway Routing Protocol-IGRP	CLO1, CLO2	1	Lecture PPT	Participatory Learning
41	The Foundation of EIGRP - EIGRP Benefits	CLO2, CLO3	1	Video	Experiential Learning
42	Characteristics of EIGRP - EIGRP Operation	CLO2, CLO3	1	Demonstration	Participatory Learning
43	Open Shortest Path First Protocol	CLO1, CLO2, CLO3	1	Video, Lecture	Problem-based Learning
44	Introducing Open Shortest Path First - OSPF Routing Hierarchy.	CLO2, CLO3	1	Video/Observation	Problem-based Learning
Unit - V					
45	Network Security Basics	CLO1, CLO2	1	Lecture PPT	Participatory Learning
46	Network Zoning	CLO2, CLO3	1	Lecture PPT	Participatory Learning
47	Recognizing Security Risks	CLO1, CLO2	1	Video, Chalk and talk	Experiential Learning
48	Introducing Security Risk Mitigation Methods	CLO2, CLO3	1	Video, Chalk and talk	Experiential Learning
49	IP Access Lists	CLO2, CLO3	1	Lecture PPT	Participatory Learning
50	Purpose of Access Lists	CLO3, CLO4	1	Demonstration	Problem-based Learning

51	Types of Access Control Lists (ACLs)	CLO3, CLO4	1	Demonstration	Problem-based Learning
52	Managing ACLs	CLO2, CLO3	1	OER	Experiential Learning
53	Creating ACLs	CLO2, CLO3, CLO4	1	Video, PPT	Experiential Learning
54	Network Address Translation (NAT)	CLO2, CLO3, CLO4	1	Video, PPT	Experiential Learning
55	Purpose of NAT	CLO2, CLO3	1	PPT	Participatory Learning
56	Operational Flow of NAT.	CLO2, CLO3, CLO4	1	OER	Participatory Learning

Course Designer

- Mrs. D. Suganthi

Name of the course	Computer Networks
Participatory Learning	30%
Experiential Learning	30%
Problem-based Learning	40 %

Course Code	Course Title	Category	L	T	P	Credit
CG23C04	Computer Organization and Architecture	Theory	43	2	-	2

Preamble

This course provides the principles and practices of digital electronics and computer system. It covers data transfer techniques, computer arithmetic operations, I/O and memory organization.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand number systems, conversions, boolean algebra and karnaugh map	K1
CLO2	Differentiate the functioning of flip-flops, multiplexer and decoder	K2
CLO3	Illustrate the concepts of register transfer, micro-operation, arithmetic operations, addressing modes and instruction format	K3
CLO4	Analyze various I/O and memory organizations	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	M	S	S
CLO2	S	S	S	S	M
CLO3	S	M	S	S	S
CLO4	S	S	S	S	S

S-Strong; M-Medium

Computer Organization and Architecture - CG23C04 (43 Hrs)

Syllabus

Unit I **9 Hrs**

Data Representation: Data Types - Number Systems: Octal & Hexadecimal Numbers, Decimal Representation, Alphanumeric Representation. Logic Circuits: Gates - AND, OR, NOT, NAND, NOR Gates and Truth Tables - Boolean Algebra.

Unit II **9 Hrs**

Flip Flops: SR, JK, D, T Flip Flops. Karnaugh Maps - Product of Sums Method - Sum of Products Method- Don't Care Condition - Decoders-Multiplexer -Demultiplexer.

Unit III **9 Hrs**

Register Transfer and Micro Operations: Register Transfer Language - Register Transfer-Bus and Memory Transfers - Arithmetic Micro Operations-Logic Micro Operations - Shift Micro Operation. Instruction Format: Three Address Instruction-Two Address Instruction-One Address Instruction-Zero Address Instruction.

Unit IV **8 Hrs**

Input / Output Organization: Input Output Interface - Asynchronous Data Transfer - DMA. Memory Organization: Memory Hierarchy - Main Memory - Cache Memory - Virtual Memory- Associative memory.

Unit V **8 Hrs**

Case study: 32bit /64bit processor architecture, Next generation computer architecture: Introduction to Graphics Processing Units (GPU) -CPU and GPU difference - Quantum Computers -Neuromorphic chips.

Text Book

S. No	Author	Title of the Book	Publisher	Year and Edition
1	M Morris Mano	Computer System Architecture	Pearson Education	2017, 3rd Edn.
2	Jim Ledin	Modern Computer Architecture and Organization: Learn x86, ARMand RISC-V architectures and the design of smartphones, PCsand cloud servers	Packt Publishing Limited	2020, 1st Edn.

Reference Books

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Yale N. Patt& Sanjay Patel	Introduction to Computing Systems: From Bits and Gates to C and Beyond	McGraw-Hill Education	2019, 3rd Edn.
2	John. L. Hennessy	Computer Architecture - A Quantitative approach	Elsevier	2018, 6th Edn.
3	William Stallings	Computer Organization & Architecture	Pearson Education	2022, 11th Edn.

Pedagogy

- Lectures, Group discussions, Demonstrations

Course Contents and Presentation Schedule

CG23C04 - Computer Organization and Architecture					
Module No.	**Topic**	**CLO level**	**No. of Hours**	**Content delivery methods**	**Learning Methods**
Unit - I					
1	Data Representation: Data Types	CLO1	1	Lecture – Chalk and Talk / Group reading	Participatory Learning
2	Number Systems: Octal & Hexadecimal Numbers	CLO1	2	PPT / OER	Participatory Learning
3	Decimal Representation, Alphanumeric Representation	CLO1, CLO2	2	Chalk and talk/ Picture	Participatory Learning
4	Logic Circuits: Gates - AND, OR, NOT	CLO1, CLO2, CLO3	1	Virtual lab	Participatory Learning
5	NAND, NOR Gates	CLO1, CLO2, CLO3	1	PPT	Problem-based Learning
6	Truth Tables	CLO1, CLO2, CLO3	1	Lecture	Participatory Learning
7	Boolean Algebra	CLO1, CLO2, CLO3, CLO4	1	PPT	Experiential Learning
Unit - II					
8	Flip Flops: SR, JK,	CLO1	1	Lecture – Chalk and Talk / Group reading	Participatory Learning
9	D, T Flip Flops.	CLO1, CLO2	1	PPT / OER	Participatory Learning
10	Karnaugh Maps	CLO1, CLO2	1	Displays	Experiential Learning
11	Product of Sums Method	CLO1, CLO2, CLO3	1	Chalk and talk	Experiential Learning

12	Sum of Products Method	CLO1, CLO2, CLO3	1	OER	Problem-based Learning
13	Don’t Care Condition	CLO1, CLO2	1	Chalk and talk/ Picture	Experiential Learning
14	Decoders	CLO1, CLO2, CLO3	1	Lecture	Participatory Learning
15	Multiplexer	CLO1, CLO2, CLO3, CLO4	1	PPT	Problem-based Learning
16	Demultiplexer	CLO1, CLO2, CLO3, CLO4	1	PPT	Experiential Learning
Unit - III					
17	Register Transfer and Micro Operations: Register Transfer Language - Register Transfer	CLO1	1	Lecture – Chalk and Talk / Group reading	Participatory Learning
18	Bus and Memory Transfers	CLO1, CLO2	1	Displays	Experiential Learning
19	Arithmetic Micro Operations	CLO1, CLO2	1	Chalk and talk	Experiential Learning
20	Logic Micro Operations	CLO1, CLO2	1	Virtual lab	Participatory Learning
21	Shift Micro Operation	CLO1, CLO2, CLO3	1	OER	Experiential Learning
22	Instruction Format: Three Address Instruction	CLO1, CLO2, CLO3, CLO4	1	PPT	Problem-based Learning
23	Two Address Instruction	CLO1, CLO2, CLO3	1	Chalk and talk/ Picture	Experiential Learning
24	One Address Instruction	CLO1, CLO2, CLO3	1	Lecture	Participatory Learning
25	Zero Address Instruction	CLO1, CLO2, CLO3	1	PPT	Problem-based Learning
Unit - IV					
26	Input / Output Organization: Input Output Interface	CLO1	1	Lecture – Chalk and Talk / Group reading	Participatory Learning

27	Asynchronous Data Transfer	CLO1, CLO2	2	Displays	Experiential Learning
28	DMA	CLO1, CLO2	1	Chalk and talk	Experiential Learning
29	Memory Organization: Memory Hierarchy	CLO1, CLO2, CLO3	1	OER	Problem-based Learning
30	Main Memory	CLO1, CLO2, CLO3, CLO4	1	Chalk and talk/ Picture	Experiential Learning3
31	Cache Memory	CLO1, CLO2, CLO3, CLO4	1	PPT	Problem-based Learning
32	Virtual Memory	CLO1, CLO2, CLO3, CLO4	1	PPT	Experiential Learning
Unit - V					
33	Case study: 32bit /64bit processor architecture	CLO1	2	Lecture – Chalk and Talk / Group reading	Participatory Learning
34	Next generation computer architecture: Introduction to Graphics Processing Units (GPU)	CLO1, CLO2	2	Chalk and talk/ Picture	Participatory Learning
35	CPU and GPU difference	CLO1, CLO2	1	Virtual lab	Participatory Learning
36	Quantum Computers	CLO1, CLO2, CLO3	2	PPT	Problem-based Learning
37	Neuromorphic chips	CLO1, CLO2, CLO3, CLO4	1	Lecture	Participatory Learning

Course Designer

- Mrs. J. Mythili

Name of the course	Computer Organization and Architecture
Participatory Learning	40%
Experiential Learning	40%
Problem-based Learning	20%

Course Code	Course Title	Category	L	T	P	Credit
CG25CP3	Computer Networks Lab	Practical	-	-	45	2

Preamble

This course imparts a detailed knowledge on designing the structure and topology of different types of networks and on configuring different routing protocols.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Design and setup different topology of network.	K1
CLO2	Understand the concept of IP address, switches and routers.	K2
CLO3	Apply VLAN and VLAN trunk protocol to connect different networks.	K3
CLO4	Implement and configure different types of routing protocols in any one topology.	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	S	M	S	S
CLO3	S	M	S	S	S
CLO4	S	S	S	M	S

S-Strong; M-Medium

Computer Networks Lab - CG25CP3 (45 Hrs)

List of Programs

- Topology of network
- Working with IP address, switches and routers
- Static routing protocol
- Routing information protocol
- Virtual local area network
- VLAN trunking protocol
- Spanning tree protocol
- Enhanced interior gateway routing protocol
- Open shortest path first protocol
- Dynamic host configuration protocol
- Telnet
- Point to point with password authentication protocol
- Network Address Translation (NAT) Configuration

- Access Control Lists (ACLs) for Network Security

Pedagogy

- Demonstration of working environment / Tools / Software / Programs

Course Designer

- Dr. J. Viji Gripsy

Course Code	Course Title	Category	L	T	P	Credit
CG25CP4	Web Technologies Lab	Practical	-	-	60	2

Preamble

This lab course introduces HTML5 tags, Cascading Style Sheets for web programming. It helps to explore client side scripting language and working with content management systems.

Course Learning Outcomes

On the successful completion of the course, students will be able to

CLO Number	CLO Statement	Knowledge Level
CLO1	Understand the purpose of HTML5 tags.	K1
CLO2	Apply CSS for effective design of web pages.	K2
CLO3	Demonstrate the power of scripting language in web development.	K3
CLO4	Design and develop dynamic web pages, websites and blogs.	K4

Mapping with Programme Learning Outcomes

CLOs	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1	S	S	S	S	S
CLO2	S	S	S	M	S
CLO3	S	S	S	S	S
CLO4	S	S	S	S	S

S-Strong; M-Medium

Web Technologies Lab - CG25CP4 **(60 Hrs)**

List of Programs

- Formatting Tag, List Tags
- Image and Anchor Tag, BG Color, Font
- Table Tags
- Frames and Frame sets
- Cascading Style Sheets - Internal, External, Inline
- Radio buttons, Check boxes and List boxes
- Validation using script
- Calculation using script
- Data binding using script
- Content management system
- Design and development of simple web site / blog
- Apply Inline CSS to style a webpage
- Design a FAQ page with collapsible sections

Pedagogy

- Demonstration of working environment / Tools / Software / Program

Course Designer

- Mrs. J. Mythili